

1. A portable ventilator system comprising a pneumatic subsystem, a power subsystem, a sensor subsystem and a logic board;

5 said logic board further comprising a timing circuit and connected to each of said subsystems;

said pneumatic subsystem, said power subsystem and said logic board further constructed so as to be enclosed within a housing having a recessed control panel.

10 2. A portable ventilator system comprising:

a hard shell device housing having an interior portion and an exterior surface;

15 said interior portion including a power subsystem connected to a pneumatic subsystem, a control subsystem, and an alarm subsystem;

said pneumatic subsystem comprising a dual head compressor connected to a single head compressor, said dual head compressor and said single head compressor constructed so as to operate at alternate times;

20 said control subsystem comprising a timing circuit connected to a relay, said relay further connected to said single head compressor and said dual head compressor so as to control on and off cycle between said dual head

compressor and allow said dual head compressor and single head compressor to operate at alternate times;

    said power subsystem comprising a battery source connected to an electronic circuit which in turn is 5 connected to a power jack, so as to supply regulated power to said pneumatic, control and alarm subsystems, said electronic circuit and said power jack further constructed so as to connect to an external power source;

    said power subsystem further comprising a voltage 10 regulator circuit so as to eliminate fluctuations in voltage to said control subsystem, said power subsystem also comprising a second voltage regulator circuit so as to supply lower voltages to said control and alarm subsystems;

    said alarm subsystem connected to said pneumatic 15 subsystem and further comprising an LED patient problem indicator so as to detect patient problems within said pneumatic subsystem, said patient problem indicator positioned on said exterior surface;

    said alarm subsystem further comprising a failure 20 detect circuit connected to a non-repairable LED indicator, said circuit and non-repairable LED indicator connected to said control subsystem, so as to visually detect non-repairable problems within said control subsystem said non-

repairable problem indicator position on said exterior surface; and

    said alarm subsystem further comprising a low voltage detect circuit connected to a repairable LED indicator,  
5    said circuit and repairable LED indicator connected to said power subsystem and so as to visually detect repairable problems within said power subsystem, said repairable indication positioned on said exterior surface.

10       3. A portable ventilator system as recited in claim 2 wherein said pneumatic subsystem further comprises a first input port constructed so as to allow ambient inhalation air to enter said ventilator;

    a first section of medical grade y-tubing constructed  
15    so as to divide said ambient inhalation air into two flow paths;

    said dual head compressor consisting of first and second input ports and first and second output ports, said input ports constructed so as to receive said ambient  
20    inhalation air from said y-tubing, said dual head compressor constructed so as to compress said ambient inhalation air, said first and second output ports further constructed as to dispel said compressed ambient inhalation air from said dual head compressor;

an air manifold constructed so as to receive said compressed ambient inhalation air and dispel said compressed ambient inhalation air to a first pressure sensor and a bi-directional flutter valve, said first 5 pressure sensor constructed so as to detect pressure of said ambient inhalation air;

said flutter valve constructed so as to have a first inlet port so as to receive said compressed inhalation air, a second bi-directional port constructed so as to transfer 10 said inhalation to a patient;

said single head compressor constructed so as to allow said second port to also receive exhalation air from said patient; said flutter valve further constructed so as to transfer said exhalation air from said second port to a 15 third outlet port, said outlet port constructed so as to allow said exhalation air to be monitored by a second sensor and transferred to a carbon dioxide detector, said single head compressor further constructed so as to remove dead air from said ventilator.

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4. A portable ventilator system as recited in claim 3 wherein said control subsystem further comprises a first resistor connected to a second resistor and a capacitor so as to generate charging and discharging cycles;

said timing circuit connected to said first resistor,  
said second resistor and said capacitor so as to establish  
on and off states corresponding to said charging and  
discharging cycles, said timing circuit further connected  
5 to said relay, said relay configured so as to provide  
increased power of said on-off states corresponding to on  
and off states of said timing circuit;

          said relay further comprising a relay control and a  
switch bar, said relay control constructed so as to switch  
10 said switch bar between a second connector position and a  
first connector position;

          said second connector position connected to said  
single head compressor so as to operate said single head  
compressor in said on and off cycle; and

15       said first connector position connected to said dual  
head compressor, so as to operate said dual head compressor  
in said on and off cycle corresponding to said increased  
power on-off states.

20       5. A portable ventilator system as recited in claim 4  
wherein said alarm subsystem further comprises a light  
alarm suppression switch and an audible alarm connected to  
an audible alarm suppression switch;

said light alarm suppression switch constructed so as to suppress said non-repairable LED indicator, said repairable indicator and said patient problems indicator; and

5        said audible alarm constructed so as to provide sound based alarms corresponding to repairable, non-repairable and patient problem indications, said audible alarm positioned on said exterior surface, said audible alarm switch further constructed so as to bypass said audible  
10 alarm as necessary.

6. A portable ventilator system as recited in claim 5 wherein said second sensor comprises a pressure sensor.

15       7. A portable ventilator system as recited in claim 5 wherein said second sensor comprises a flow sensor.

8. A method of operating a portable ventilator comprising the steps of:

20       (a) drawing ambient inhalation air into a dual head compressor,  
  
                 (b) compressing said ambient air in said dual head compressor and monitoring the pressure of said compressed

air while maintaining a single head compressor in an off position;

(c) transferring the compressed inhalation air into an air manifold and causing a flutter valve to open;

5 (d) transferring said compressed inhalation air from said manifold to said flutter valve through an input port;

(e) transferring said compressed inhalation air to a patient through a second bi-directional port in said flutter valve;

10 (f) maintaining an exhale port of said flutter valve closed when operating said dual head compressor;

(g) operating single head compressor to close off said input port and open exhale port, turning off said dual head compressor at the point when single head compressor is 15 turned on, and allowing exhalation air from said patient to enter bi-directional port;

(h) transferring exhalation air through said exhale port and verifying the presence exhalation air using a second sensor; and

20 (i) removing exhalation air from said ventilator, through a patient exhale port.

9. A method of operating a portable ventilator as recited in claim 8 and further comprising the step of:

measuring concentration of carbon dioxide in exhalation air using a capnography sensor.

10. A method of operating a portable ventilator as  
5 recited in claim 9 and further comprising the steps of

(a) obtaining said on and off cycles using a timing circuit;

(b) controlling on and off cycles for said dual head compressor and said single head compressor using a relay

10 switch;

(c) obtaining inhalation and exhalation cycles for the patient using said portable ventilator, said inhalation and exhalation cycles corresponding to said on and off cycles of said dual head and single head compressor;

15 (d) providing visual and audible alarms corresponding to patient related problems; and

(e) providing visual and audible alarms corresponding to ventilator repairable and non-repairable problems.

20 11. A method of operating a portable ventilator as recited in claim 10 comprising using a pressure sensor as said second sensor.

12. A method of operating a portable ventilator as recited in claim 10 comprising using a flow sensor as said second sensor.

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